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| 10/067,711      | 02/05/2002  | Joachim Szczymbowski | LYB3-210.1-Cont     | 8488             |

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT PAPER NUMBER

1753

DATE MAILED: 09/12/2003

*6*

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/067,711

Applicant(s)

SZCZYRBOWSKI ET AL.

Examiner

Steven H VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22, 23 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22, 23 and 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 08/959,633.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on August 14, 2003. These drawings are acceptable.

### ***Specification***

2. The amendment filed August 12, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: a coating rate of "> 40 nm/min" on page 2 and a coating rate of "21 nm/sec" on page 6.

Applicant is required to cancel the new matter in the reply to this Office Action.

### ***Claim Objections***

3. Claims 22, 27, and 29 are objected to because of the following informalities: "to" needs inserted after "output" in claim 22 at line 3. Claims 27 and 29 depend from claim 22 and contain all of the limitations of claim 22. Therefore, claims 27 and 29 are objected to for the same reasons as claim 22. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 22, 27, and 29 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed,

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had possession of the claimed invention. Claim 22 requires the target to be "sprayed" (see line 7), but there is no support in the specification as originally filed for the target to be "sprayed". Therefore, the matter is considered to be new and must be canceled. Claims 27 and 29 depend from claim 22 and contain all of the limitations of claim 22. Therefore, claims 27 and 29 are rejected for the same reasons as claim 22.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 22, 23, and 27-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 22 recites the limitation "the sputter target" in line 3. There is insufficient antecedent basis for this limitation in the claim.

9. Claims 27 and 29 depend from claim 22 and contain all of the limitations of claim 22. Therefore, claims 27 and 29 are rejected for the same reasons as claim 22.

10. Claim 23 recites the limitation "the plasma discharge" in line 7. There is insufficient antecedent basis for this limitation in the claim.

11. Claims 28 and 30 depend from claim 23 and contain all of the limitations of claim 23. Therefore, claims 28 and 30 are rejected for the same reasons as claim 23.

12. The term "smooth" in claims 27 and 28 is a relative term which renders the claim indefinite. The term "smooth" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

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reasonably apprised of the scope of the invention. It is not clear how smooth the surface must be to be considered "smooth".

13. Claims 29 and 30 depend from claims 27 and 28 respectively and contain all of the limitations of claims 27 and 28. Therefore, claims 28 and 30 are rejected for the same reasons as claims 27 and 28.

14. The term "high optical quality" in claims 29 and 30 is a relative term which renders the claim indefinite. The term "high optical quality" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear how high the optical quality must be to be considered "high".

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 22, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,169,509 to Latz et al. (Latz) in view of US 5,415,757 to Szcyrkowski et al. (Szcyrkowski) and *Thin Film Processes* by Vossen et al. (Vossen).

17. For claim 22, Applicant requires a method for sputter-induced deposition of metal oxide layers by reactive sputtering comprising supplying an electrical output to the plasma discharge by means of at least two electrodes arranged adjacent to one another where the output is selected such that the metal oxide layers are deposited at a growth rate of  $\geq 4$  nm/s, the substrate is

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stationary, and AC power is supplied to the electrodes at a frequency of 10-80 kHz. For claim 27, Applicant requires the metal oxide layer to be smooth. For claim 29, Applicant requires the layer to have high optical quality.

18. Latz discloses a sputtering process (col. 3, l. 11-21) comprising providing two electrodes 5, 5a each connected to AC power (abstract). During the deposition process, metal targets are reactively sputtered in an atmosphere of oxygen to produce a metal oxide (col. 2, l. 29-35). The frequency of the AC power is 1-100 KHz (col. 3, l. 11-14). The substrate does not move (Figure 1). The deposited layer would have high optical quality and be smooth.

19. Latz does not disclose the deposition rate or specify the frequency to be specifically between 10-80 kHz.

20. Vossen discloses that deposition rate is directly proportional to the power applied to the targets such that increasing the power supplied will increase the deposition rate (pg. 61-62). Therefore, the deposition rate is a result effective variable.

21. It would have been obvious to one of ordinary skill in the art at the time the invention was made to deposit the metal oxide at a rate of  $\geq 4\text{nm/s}$  because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA.1980).

22. Szcyrkowski discloses that when AC sputtering, the ideal frequency is 40 kHz because it results in the best quality film produced because the arcing buildup is reduced (col. 5, l. 30-68).

23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Latz to utilize a frequency of 40 kHz because of the desire to produce the metal oxide film with the best properties.

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24. Claims 23, 28, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over

*Reactive alternating current magnetron sputtering of dielectric layers* by Scherer et al.

(Scherer) in view of *Thin Film Processes* by Vossen et al. (Vossen).

25. For claim 23, Applicant requires a method for sputter-induced deposition of metal oxide layers by reactive sputtering wherein an electrical output is supplied to the plasma discharge where the output is selected such that the metal oxide layers are deposited at a growth rate of  $\geq 40$  nm m/s, the substrate is moved along in front of the targets, and AC power is supplied to the electrodes at a frequency of 10-80 kHz. For claim 28, Applicant requires the metal oxide layer to be smooth. For claim 30, Applicant requires the layer to have high optical quality.

26. Scherer discloses a process for depositing a metal oxide layer by reactive AC magnetron sputtering (abstract). The process involves using an apparatus with two electrodes (Figure 1a) and applying the AC power at a frequency of 40 kHz (pg. 1772). The substrates are moving (Figure 1a). The deposited layer would have high optical quality and be smooth.

27. Scherer does not disclose the deposition rate for the metal oxides to be  $\geq 40$  nm m/s, but does disclose that the deposition rate achieved for 7kW power applied when forming aluminum oxide to be 3.3 nm (Table 1).

28. Vossen discloses that deposition rate is directly proportional to the power applied to the targets such that increasing the power supplied will increase the deposition rate (pg. 61-62).

Therefore, the deposition rate is a result effective variable.

29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to deposit the metal oxide at a rate of  $\geq 40$  nm m/s because it has been held that

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discovering an optimum value of a result effective variable involves only routine skill in the art.

*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

***Response to Amendment***

30. The objection to the lack of a priority statement presented in the office action mailed April 16, 2003 is withdrawn in light of the amendment.

31. The objection to the drawings presented in the office action mailed April 16, 2003 is withdrawn in light of the newly presented drawings.

32. The objection to the specification presented in the office action mailed April 16, 2003 is withdrawn in light of the amendment, but a new matter objection is presented above.

33. The 112-first paragraph rejection of claim 23 presented in the office action mailed April 16, 2003 is withdrawn in light of the amendment, but the rejection of claim 22 stands because the term "sprayed" still remains in the claim.

34. The 112-second paragraph rejections for claims 22 and 23 stands as noted above and are withdrawn for all other 112-second paragraph rejections presented in the office action mailed April 16, 2003.

35. All 103(a) rejections presented in the office action mailed April 16, 2003 stand.

***Response to Arguments***

36. Applicant's arguments filed August 12, 2003 have been fully considered but they are not persuasive.

37. Applicant has argued that it is not obvious to adjust the power to adjust the sputtering rate because other parameters will also affect the deposition rate. Applicant is correct in that Vossen discloses that several parameters can affect deposition rate, but Vossen explicitly states that "All



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other things being equal, rates are linearly proportional to power and decrease with increasing target-substrate separation" (page 61). Because of that statement, I feel that the sputtering rate claimed by Applicant would be obvious.

38. Applicant also argues that Scherer only achieves a deposition rate of up to 3.8 nm/s. That may be what Scherer achieved, but that does not mean that that 3.8 nm/s is all that is obvious. As taught by Vossen, increasing the power will increase the deposition rate. Thus, I believe that Applicant's deposition rate is obvious. If one of ordinary skill in the art were confronted with Scherer and Vossen, it would be obvious to increase the power to increase the deposition rate. There would be a reasonable probability of success (based upon Vossen's teachings).

#### ***General Information***

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (703) 308-0661.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Palestine Jenkins at (703) 308-3521.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (703) 308-0661.

#### ***Conclusion***

39. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (703) 305-4473. The examiner can normally be reached on Mon - Thurs (7:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (703) 308-3322. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
September 11, 2003